But Miss Sargant's principal work lay in the direction of anatomy and morphology: she possessed the "morphological sense" to a most remarkable degree, and the anatomy of seedlings became a subject which she made peculiarly her own. She formed a unique collection of microscopical preparations illustrating the vascular anatomy of monocotyledonous seedlings. She was the first botanist to apply microtome technique to the elucidation of the problems presented by the anatomical transition from stem to root; owing to the extreme shortness of the hypocotyl in many monocotyledonous seedlings, it is often quite impossible to demonstrate their structure by means of hand sections alone. In a series of papers, the great majority of which appeared in the *Annals of Botany,* she developed her well-known theory of the origin of monocotyledons, based upon the results of her researches into seedling structure. In 1913 she was president of Section K (Botany) at the Birmingham meeting of the British Association, being the first woman chosen to preside over a section. She took for the subject of her address "The Development of Botanical Embryology since 1870," and gave a masterly review of a difficult and controversial field, in which she had herself broken much new ground.

NOTES.

THE gold medal of the Royal Astronomical Society has been awarded by the council of the society to Mr. John Evershed for his investigations of radial motion in sun-spots and other contributions to astrophysics. The Hannah Jackson (*née* Gwilt) gift has been awarded to the Rev. T. E. R. Phillips for his observations of planets, double stars, and variable stars. The awards will be presented at the annual general meeting to be held on Friday, February 8.

THE scheme for the reconstitution of the Labour Party, to which we referred last week (p. 404), providing for representation of producers "by brain" as well as "by hand," was submitted by Mr. Henderson on behalf of the executive to the conference at Nottingham on January 23. After discussion it was decided that the draft scheme should be referred to the affiliated societies, and that another conference should be called in a month's time to consider it.

THE proposed formation of a British Association of Chemists will be discussed at the meeting of the London Section of the Society of Chemical Industry to be held at the Royal Society of Arts on Monday, February 4, at 7.30 p.m.

THE death has occurred, in his sixty-seventh year, of Mr. Louis P. Gratacap, curator in mineralogy in the American Museum of Natural History since 1900. For the previous nine years he had held the post of assistant curator. His publications included a standard "Guide to Mineral Collections," "Popular Mineralogy," and "Geology of the City of New York."

THE death is announced, at the early age of forty-five, of Dr. T. C. Janeway, who occupied, at Johns Hopkins University, the chair of medicine formerly filled by Sir William Osler. He was a member of the Board of Scientific Directors of the Rockefeller Institute for Medical Research, and secretary of the Russell Sage Institute of Pathology. Prof. Janeway was the author of "The Clinical Study of Blood Pressure."

THE Research Defence Society and the Association for the Advancement of Medicine by Research have been united into one society, which will retain the name and official address of the Research Defence Society. All such communications as used to be made to the association should, therefore, now be made to the honorary secretary of the Research Defence Society, 21 Ladbroke Square, London, W.11.

IN consequence of a statement from F. I. Faltz-Fein directing attention to the dangers which, in the present circumstances, threaten the existence of the famous zoological park and horse-breeding station on his estate at Ascania Nova, the council of the All-Russian Horse-breeders' Congress brought the matter to the notice of the Petrograd Academy of Sciences, with the earnest request that immediate and energetic measures be taken for the protection of an establishment which is of very great scientific value, and justly considered the pride of Russia. It is announced in the December Bulletin of the Academy that, in response to this appeal, the Government has instructed Maj.-Gen. P. K. Kozlov to take the necessary measures.

ACCORDING to reports in the French Press, a "General Congress of Civil Engineering" will be held in Paris on March 18–23 next. The objects of the conference, as recently explained to the French Minister of Commerce and Industry, are to awaken the French nation to the need for increased industrial enterprise and the attainment of industrial agreement. The Minister expressed the hope that the conference would give very close attention to such questions as the saving of fuel and the thorough utilisation of intellectual and mechanical effort; wage war on waste of all kinds; and advocate the systematic utilisation of by-products, and the adoption of improved scientific mechanical methods of production—in short, give that place to applied knowledge that it now merits.

THE Minister of Reconstruction has appointed the following committee of manufacturers and business men to consider the provision of new industries for the engineering trades:—The Hon. H. D. McLaren (chairman), Mr. C. Bennion, Sir George Bullough, Bart., Mr. F. H. Crittall, Mr. R. Dumas, Mr. W. B. Lang, Mr. C. A. Lister, Mr. P. J. Pybus, Mr. G. H. Sankey, Sir Percy Stothert, Mr. J. Taylor, Mr. W. Taylor, Mr. W. Thom, and Sir W. Rowan Thomson. The duties of the new committee will be to compile a list of the articles suitable for manufacture by British engineers which were either not made in the United Kingdom or made in insufficient quantities, and for which there is likely to be a demand after the war. The need for such a list of articles and for some organised effort to make them at home has been amply shown by the war, which has revealed our dependence on many—even the enemy—countries for articles vital to our industries, and even to our war equipment.

BY the death of Lieut. E. J. Woodhouse in France on December 18 last, from wounds received early in the month, the Indian Agricultural Service has lost a capable organiser and adviser. Educated at Marlborough, Lieut. Woodhouse entered Trinity College, Cambridge, in 1903. In 1906 he graduated with honours in the Natural Sciences Tripos, and the following year obtained the University diploma in agriculture. He then proceeded to India to take up the post of economic botanist to the Government of Bengal. Three years later he was appointed principal of the Agricultural

College of Bihar and Orissa, but still retained his post as economic botanist. His chief work was on problems connected with economic botany, but he also undertook some work on economic entomology, and successfully demonstrated a method of reducing the attacks of surface caterpillars on a very large scale and of reducing the attacks of potato moths in Bengal. At the outbreak of the war he was a captain in the Bihar Light Horse, and in February, 1915, joined the Indian Army Reserve of Officers. In July of that year he went to France, where he carried on with his usual energy. Lieut. Woodhouse was a capable worker, and won the good opinion of all who came in contact with him.

It is with regret that we have to record the passing of another veteran from the ranks of the great engineers of the Victorian era. Sir Alexander Meadows Rendel has just died at the ripe age of eighty-eight. His death recalls the construction, rather more than sixty years ago, of the Royal Victoria Dock and of the Shadwell Basin, London Docks, when he acted as engineer to the London Dock Company. Sir Alexander had then just succeeded to the practice of his father, Mr. James M. Rendel, F.R.S. The family was, in fact devoted to engineering work, both by tradition and natural inclination. All four of Mr. Rendel's sons attained distinction and repute, three of them, including Lord Rendel, in connection with the great firm at Elswick, of which Lord Armstrong was the head. It was fitting, therefore, and almost inevitable, that, on the completion of his academic training at Cambridge, where he was a scholar of Trinity, the eldest son should pass into the office of his father. In addition to the docks mentioned above, Sir Alexander was responsible for the Albert and Edinburgh Docks at Leith. But it is principally in connection with India that his name will be remembered. He was consulting engineer to the India Office and to many of the Indian railway companies. He designed and constructed a very large number of bridges, of which the most important were the Lansdowne Bridge over the Indus at Sukkur, opened in 1889, and the Hardinge Bridge, over the Ganges at Sara, completed in 1915. He paid a number of visits to India, and so close was his association with Indian affairs that it is not too much to say that over a period dating from days before the Indian Mutiny he exercised a very considerable influence, not only in strictly engineering matters, but on the general policy and administration of the Indian railway system.

The death, about three months ago, of Dr. Maryan Smoluchowski de Smolan, professor of physics at the University of Cracow, Poland, at forty-five years of age, deprives the scientific world of a pioneer in the field of modern thermodynamics and the kinetic theory of matter. Smoluchowski's chief investigations, already crowned with notable success and full of promise for the future, centred round the problems of the so-called fluctuations about the average, normal state of statistical equilibrium. The most prominent example of his researches of this kind is his famous explanation of the opalescence of gases at or near the critical state. Most of Smoluchowski's papers were published in the Transactions and the Bulletin of the Academy of Sciences of Cracow. A good summary of his own work and of the problems that most interested him will be found in his report in the *Physikalische Zeitschrift*, vol. xiii. (1912), p. 1069. The non-specialist will find an easily accessible description of some of his researches in Perrin's attractive book "Les Atomes." Smoluchowski's scientific attitude and tendencies, however, are best characterised in his address given at the University of Göttingen, "On the Limits of Validity of the Second Law of Heat Theory" (*cf.* "Vorträge üb. d. kinet. Theorie d. Materie u. d. Elektrizität von Planck, Debye, Nernst, Smoluchowski, Sommerfeld u. Lorentz"; Leipzig: Teubner, 1914, pp. 89–121). This admirable lecture will be found to contain not only a clear explanation of the famous difficulties connected with Boltzmann's H-theorem, but also a fascinating description of the *rôle* of fluctuations as restrictors of the validity of the second law of thermodynamics, increasing at the same time the true value of that law, and presenting it in an interesting light.

Very soon after the commencement of the war the Government of this country was made to realise that the services of chemists, as distinguished from pharmacists, are really of essential national importance. The special position as regards recruiting for the Army, into which chemists of high qualification were placed, is evidence of this recognition. Even yet, however, a large proportion of the general public is unaware of the importance of the chemist in industry, one of the causes of this being the fact that, unlike the French and the Germans, we do not in general distinguish between "chemists" and "pharmacists"; in fact, the term "chemist" is legally confined to compounders and vendors of medicine. Recognition by public opinion of the importance of the chemist is necessary in order to secure his adequate remuneration, and until this is secured there will be an insufficiency of chemists, and therefore no chemical industry worthy of the name. Recently, however, signs have not been wanting that the condition of the chemical industry and the position of the chemist are beginning, and likely to continue, to improve. The latest sign is the alteration in character of the Journal of the Society of Chemical Industry, upon which we venture to congratulate both the society and the review editor. The Journal has always been an exceedingly valuable one, but until recently it was rather machine-like, and the human element was chiefly conspicuous by its absence. In it one sought the abstracts under the heading of particular interest to oneself, and glanced at the titles of the papers to discover one of interest—and that was all. Now, however, that there is a review section, including articles of general interest, trade reports, Parliamentary and legal news, signed reviews of chemical books, reports of meetings of the different sections, and of those of other societies, almost every chemist will be able to pick up the Journal with the practical certainty of finding something of interest. Further, the Journal now has a better chance of appealing to those who are not chemists, and so helping to educate the public as to what a chemist really is.

We regret to see the announcement of the death, on January 23, of the veteran alienist, Dr. Henry Maudsley. He was born near Settle, in Yorkshire, in 1835, and he graduated from University College Hospital as M.D. of London in 1857. Through a busy professional life as superintendent of Manchester Asylum, physician at the West London Hospital, professor of medical jurisprudence at University College, and so on, he kept up a strong interest in psychological and philosophical problems, and he was for many years editor of the *Journal of Mental Science*. A keen intellectual combatant, absolutely sincere and fearless, he played a notable part among notable men at a time of great scientific activity—the last quarter of the nineteenth century. It was apparently under the influence of Herbert Spencer that Dr. Maudsley was early in the field in applying evolutionist conceptions to psychology. His "Responsibility in Mental Disease" appeared in 1874, and was the first of many works. such as "Physiology of Mind," "Pathology of Mind," "Body and Will," which did useful service to psychological science in emphasising the intimate way in which physiological factors are bound up with psychical factors in the unified life of the creature. Central to his whole thinking was the idea of the unity of the organism in which mental and motor activities are closely correlated, and he never wavered from this position, which was vigorously expounded in his "Organic to Human," published less than a couple of years ago. Dr. Maudsley was essentially "tough-minded," and his pre-occupation with mental diseases probably exaggerated his distrust of "over-strained idealism of any sort." Deepest in his life, perhaps, was the desire to further by his investigations and thinking a scientific systematisation which would make for the relief of man's estate. Towards that end, ten years ago, he generously contributed 30,000*l.* to the London County Council for developing the treatment of mental diseases. What we venture to call his mood of scientific meliorism, sometimes shadowed, was expressed in the fine sentence: "By large and close and faithful converse with Nature and human nature in all their moods, aspects, and relations is the solid basis of fruitful ideals and the soundest mental development laid."

IN a recent number of *West Africa* (January 19) Mr. R. E. Dennett suggests the formation of a Union for the study of the British West African Colonies and the advancement of their interests in this country. Mr. Dennett begins by pointing out how necessary it is that British West Africa should have a showroom in one of the principal London thoroughfares, where produce and pictures of typical West African scenes could be displayed. The foundation of such a showroom might, he suggests, be the first step towards the formation of a union to co-ordinate work for British West Africa. There would be scope for talent of every kind in this union, since the activities of its sections would range over such diverse subjects as superstitions and mythology, sanitation, forms of government, banking, utilisation of produce, transport, hospitality to distinguished West Africans, and the care of West African students. Much work for West Africa is already being done, as Mr. Dennett admits, by the Imperial Institute, the Royal Colonial Institute, Kew Gardens, and various learned and other societies, and though he disclaims any intention of competing with existing institutions, the details of his scheme include suggestions for some work which is already being done. What is really needed at present is a union the main business of which would be to stimulate the organisations already at work for West Africa, including the Government, instead of trying to do any part of the work itself. It is well known, for example, that the quality of much West African produce needs improvement, that the agricultural and forest departments in these territories need larger staffs and more funds, and that further means of transport are required. A union competent to speak for West Africa would be usefully employed in directing public attention to these and other equally important matters, and in taking action through the proper channels to get them remedied. If such a union had existed it could scarcely have remained quiet when last month a great part of the exhibition galleries of the Imperial Institute, including the only exhibit of West African produce in London, was closed to the public by the Office of Works to accommodate a branch of the Ministry of Food.

LORD LEVERHULME discusses, in *Science Progress* for January, the question of the abolition of slums. The slum problem is, he observes, merely a case of bad "packing," because, while most towns have slums, the majority of them possess within their boundaries a sufficient area of land to accommodate three times their present population. Lord Leverhulme's suggestion is that each municipality should acquire, as occasion offers, the fringe of land on its suburbs, and that the municipality could afford to give this land to persons ready to build houses thereon. With the general adoption of the Town Planning Act the present scandalous condition of things might be removed.

SIR C. H. READ describes, in *Man* for January, two bronzes acquired from a Parsi in Bombay, who stated that his family had possessed them from time immemorial, and that they had been brought by one of his ancestors from Persia, where they had been attached to the gate of the city whence the Parsi family had come. They are castings by the wax process, known as *cire perdue,* and represent animals which at once recall the bull-like monsters of Assyria; but, at the same time, there are differences that may be of some significance. The Assyrian bulls are human-headed, and these also have human heads, but while the modelling of the bodies suggests a bull, the horns are unquestionably those of a sheep. This sheep has been identified by Lord Rothschild as *Ovis orientalis gmelini,* the wild sheep of Asia Minor and Armenia. It is possible that these bronzes were ultimately derived from Assyria, and as the relations between Assyria, Persia, and Armenia were intimate, the story of the Parsi may be correct. But many questions regarding the style and use of these bronzes, which will ultimately pass to the British Museum, await further investigation.

IT was stated in one of the morning papers a few days ago that "there have recently arrived in England evidences of the most important zoological discovery that has come to light since the finding of that strange beast, the okapi. . . . This discovery proves very completely the existence of a new and hitherto unknown species of elephant, a real dwarf elephant." All that has really happened is that two skeletons have just arrived in this country of a "dwarf" race of elephant described in the *Revue Zoologique Africaine* in 1913. Thus the announcement of this "discovery" is somewhat belated. The specimens just received are stated to be fully adult examples, but this is not yet certain, and will be determined by Dr. C. W. Andrews, of the British Museum of Natural History, to whom they have been submitted. But we have known of the existence of dwarf elephants in Africa since 1906, when the first of its kind was discovered. This came into the possession of Hagenbeck, the German dealer in live animals, who sold it to the Zoological Society of New York, in the gardens of which it is still living. This animal forms the type of the species *Elephas africanus pumilio.* The species referred to in 1913 was described under the name *Elephas africanus frennseni.* The specimen obtained by Hagenbeck now stands about 5 ft. high, but whether this is its maximum height is open to question, since its growth may have been checked by a troublesome skin disease from which it has long suffered. The specimens described in 1913, from Lake Leopold II., measured some 6 ft. in height, which is stated to be the height of the taller of the two animals the skeletons of which have just been received. These may not prove to be adult, so that the precise amount of dwarfness of these "dwarf" elephants has still to be determined, but it seems certain that they are far smaller than the typical African elephant, though they are giants compared with the extinct dwarf elephant of Malta.

In the *Australian Zoologist* (vol. i., part 4, Sydney, October 8, 1917) there is an interesting article by Mr. Charles Hedley, director of the Australian Museum, on the economics of *Trochus niloticus*. This handsome shell was mistaken for a product of the Nile by Aldrovandus, who, in 1606, was the first writer in Europe to describe it. Mr. Hedley tells us that it is found on coral-reefs from Ceylon to Samoa, and as far north as Japan. The natives of various islands make use of the animal as food, and the periphery of the shell has been cut out and worn as a bracelet by the Papuans. But among civilised people it was only known to shell fanciers until a few years ago. "Exhaustion of former supplies of pearl shell and the increasing demand of recent years have promoted search for new sources of mother-of-pearl. Thus *Trochus niloticus,* or trocas, as it is sometimes called, having dense firm nacre, which proved good material for buttons, came to be exploited by manufacturers. During the past six years an active request for Trochus by button-makers has sprung up, advancing from 20*l.* to 30*l.* a ton." The Great Barrier Reef is being fished for Trochus, from Torres Straits southwards to Port Mackay. The export of Trochus from Queensland in 1915 was 544 tons, worth 12,000*l.*, and in 1916 was 950 tons, worth 23,000*l.* The Philippine Islands export about 320 tons annually. From Western Australia the exports of Trochus were:—For 1912, 52 tons; for 1913, 66 tons; for 1914, 19 tons; for 1915, 73 tons; for 1916, 26 tons. There are also large fisheries in New Guinea, the Solomon Islands, and Fiji. Some Japanese fishermen carefully save both meat and shell. From ten tons of shell a ton of meat is obtainable, worth, in China, 20*l.* a ton. Mr. Hedley considers that the annual Australian crop of Trochus is likely soon to deteriorate under the present active fishery.

THE annual report of the Department of Agriculture, Nyasaland, for the year ending March 31, 1917, contains much interesting matter. The exports of tobacco, tea, and cotton constitute a record for the Protectorate, and the past year has been particularly favourable for agriculture generally, despite the difficulties arising out of the war and the absence of many planters on military service. The increased demand for tobacco is a direct result of the privileged admission of British-grown tobacco into the United Kingdom, and, despite high prices for freight, the industry is very prosperous, and has now established itself in the home market. Nearly 1000 more bales (400 lb.) of cotton were exported than in the previous year, and the acreage under European cultivation is now 29,580. Tobacco first appeared as an article of export in 1899, and, despite freight charges, has managed to establish itself against American competition. Tea to the extent of 420,685 lb. was exported, whilst in the previous year the amount was 288,341 lb. The great difficulty with regard to Nyasaland products is that of freight and transport, and much damage to cotton and tobacco results during the difficult journey to the coast. There is also the drawback that owing to delays the planter can seldom realise on his crops within one year of the date of shipment, thus necessitating double capital, or planting on advance rates, which eat deeply into profits. Until direct railway communication with the coast can be established this promising land will remain very severely handicapped.

THE *Scientific American,* in its issue of December 22 last, directs attention to the low efficiency of massed rifle fire at ranges less than 500 yards. It appears that the best results ever obtained were by the Boers at Colenso, when in full daylight and from a sheltered position they succeeded in making one hit in 600 shots fired against an enemy thoroughly exposed in the open. This lack of success of the rifle at close ranges leads to its being regarded rather as a handle for a bayonet than as an effective weapon itself. It seems that no amount of preliminary training or of adjustment of sights can eradicate the tendency of the rifleman to shoot too high when under mental stress. To overcome this difficulty Col. Ely, of the American Army, has invented an attachment weighing only 2 oz. which, when adjusted, prevents the rifle being discharged when its angle of elevation exceeds a given value. The records obtained with the device are about twenty-four times as good as the Colenso results, but it does not appear to have been adopted by the American military authorities.

THE importance of modern methods of welding in enabling repairs to be executed quickly has been brought out by a recent account in *Engineering* (January 11) of the methods adopted for making good the damage done by the Germans on vessels interned in U.S. ports. The principle of electric welding has been applied to fifteen ships in the port of New York, and all these are now in commission and probably ready for service. Bulletin No. 98 of the University of Illinois Engineering Experiment Station is also of interest, and gives an account of tests of oxyacetylene welded joints in steel plates. The plates employed varied in thickness from No. 10 gauge to 1 in., and were subjected to various heat treatments. The tests include static loads, repeated loads, and impact. The welds were made by skilled workmen For joints with no further treatment after welding, the joint efficiency for static tension was found to be about 100 per cent. for plates up to ½ in. thick, and to decrease for thicker plates; these joints show an efficiency not greater than 75 per cent. for the material in the joints, but were strengthened by working the metal after welding and weakened by annealing at 800° C. Repeated stress tests followed in a general way the results of the static tests. Hammering or drawing the weld while hot increases the strength. The impact tests show that oxyacetylene welded joints are decidedly weaker under shock than is the original material; for joints welded with no subsequent treatment, the strength under impact seems to be about half that of the material. If the welded joint is worked while hot, the impact-resisting qualities are slightly improved. Annealing from 800° C. seems to have very little effect on the impact-resisting qualities.

MESSRS. H. K. LEWIS AND CO., LTD., hope to publish in the course of the next few weeks vol. i. of "Regional Surgery," a work by American and British authors, in three volumes, edited by Dr. J. F. Binnie, Gould's "Pocket Medical Dictionary," Stitt's "Tropical Diseases," and Stitt's "Practical Bacteriology." The first consignment of these books was lost at sea by a gale.

THE twentieth issue of "The Scientist's Reference Book and Diary"—that for 1918 has now been published by Messrs. Jas. Woolley, Sons, and Co., Ltd., of Manchester, at the price of 2*s.* 6*d.* As usual, it consists of two parts: the first is a storehouse of physical and chemical constants, definitions, and important scientific facts; and the second is a conveniently arranged diary and memorandum book. The two are bound together in a leather case suitable for carrying in the pocket.

THE following books are announced for publication during February by Messrs. Chapman and Hall, Ltd.:—"The Chemistry of Colloids," by Prof. R. Zsigmondy, translated by Prof. E. B. Spear, part ii., Industrial Colloidal Chemistry, by Prof. E. B. Spear, and a chapter on Colloidal Chemistry and Sanitation by Prof. J. F. Norton; "An Introduction to Theoretical and Applied Colloid Chemistry," by Dr. W. Ostwald, translated by Prof. M. H. Fischer; "Biochemical Catalysts in Life and Industry: Proteolytic Enzymes," by Prof. J. Effront, translated by Prof. S. C. Prescott and C. S. Venable; "Practical Pyrometry," by E. S. Ferry, G. A. Shook, and J. R. Collins; "Hand Grenades," by Major G. M. Ainslie; "Ordnance and Gunnery," by Lt.-Col. W. H. Tschappat; "Hydro-Electric Power-Stations," by E. A. Lof and D. B. Rushmore; "A Practice Book in Elementary Metallurgy," by Prof. E. E. Thum; "Testing for the Flotation Process," by A. W. Fahrenwald; an enlarged edition of "Practical Instructions in the Search for, and the Determination of, the Useful Minerals, including the Rare Ores," by A. McLeod; "The Development of Forest Law in America," by J. P. Kinney; and reprints of "Scientific and Applied Pharmacognosy," by Prof. H. Kraemer, and "Applied and Economic Botany," by Prof. H. Kraemer.

OUR ASTRONOMICAL COLUMN.

THE PLANET SATURN.—This beautiful telescopic object will be in opposition to the sun on January 31, and will be very favourably placed for telescopic scrutiny during the ensuing few months. There is evidence to show that much the same phenomena occur on Saturn as on Jupiter, and that occasionally disturbances on a considerable scale occur in the atmosphere of the former object. Yet it has not been very successfully observed when we compare the results with those obtained with regard to Mars and Jupiter. The far greater distance of Saturn and the less conspicuous character of the markings are no doubt in part responsible for this, but sometimes, as in 1903, the spots and irregularities in the belts are very plain and numerous.

The rotation period of Saturn requires redetermination, for the markings in different latitudes exhibit proper motions. Prof. Hall's white equatorial spot of 1876–77 gave a period of 10h. 14m., whereas the dark and light markings which were visible in the north temperate region in 1903 indicated a period of about 10h. 38m., or twenty-four minutes longer.

UNIT OF STELLAR DISTANCE.—As a step towards the extension of the decimal system to celestial measurements, and the unification of units in the statement of stellar distances, it is suggested by M. de Rey Pailhade that a convenient unit would be 10^{10} kilometres (*L'Astronomie,* December, 1917). A light-year is equivalent to 946 of such units, or approximately 1000, which is a number easily remembered. The parsec, which corresponds to 3·25 light-years, is very closely 3000 units, and the distance of 61 Cygni would be expressed by 5865. On the same system, the mean distance of the earth from the sun is 0·015, and that of Neptune 0·450. The symbol suggested for the new unit is Us (*unité stellaire*), but this does not seem to be well adapted for countries other than France.

RELATIVITY AND SHIFTS OF FRAUNHOFER LINES.—According to Einstein's theory of relativity, the lines in solar and stellar spectra should be displaced towards the red by an amount depending upon the difference in gravitational potential between the gravitational field in which the lines originate and the terrestrial field where the radiation is received. In the case of the sun the theoretical displacement is equivalent to the Doppler displacement due to a radial velocity of 0·634 km. per sec., and at λ 5000 amounts to 0·010 A. With the powerful instruments now in use in solar observations such a shift of the lines should be easily measurable. The question has been taken up at Mt. Wilson by Dr. St. John, who has selected some of the band lines of cyanogen as the most suitable for the purpose, in consequence of their freedom from displacements due to pressure (*Astrophysical Journal,* vol. xlvi., p. 249). The mean sun *minus* arc displacement at the centre of the sun for the forty-three band lines measured was zero, while for thirty-five lines at the limb it was only +0·0018 A. It cannot be assumed, therefore, that the Einstein effect is annulled at the centre by an outward radial motion of the solar vapours, as the effect of such a motion would vanish at the limb and the gravitational effect should appear. The observations accordingly give no evidence of a displacement of the lines of the order of magnitude required by the principle of relativity.

THE "ANNUAIRE ASTRONOMIQUE" FOR 1918.—The current issue of this useful publication maintains the high standard reached in former years. Besides the usual tables relating to the sun, moon, and planets, it includes a series of charts showing the aspect of the heavens in each month, and interesting notes on a great variety of astronomical subjects. A general review of progress in the various departments of astronomy and meteorology is a valuable feature. The Annuaire is published at 3 francs by the Librairie Ernest Flammarion, Paris.

PARIS ACADEMY OF SCIENCES.

PRIZES PROPOSED FOR THE YEAR 1919.

Mathematics.—Francœur prize (1000 francs), for discoveries or works useful to the progress of pure or applied mathematics.

Mechanics.—Montyon prize (700 francs), for the invention or improvement of instruments useful to the progress of agriculture, the mechanical arts, and the practical and speculative sciences; Poncelet prize (2000 francs), for work useful to the progress of mechanics.

Astronomy.—The Lalande prize (540 francs), for the most interesting observation in, or memoir most useful to the progress of, astronomy; Benjamin Valz prize (460 francs), for work on astronomy under similar conditions to those of the Lalande prize; G. de Pontécoulant prize (700 francs), for the encouragement of work in celestial mechanics.

Geography.—Gay prize (1500 francs). The question proposed for 1919 is the study of the physical geography of North Africa, and principally Mauritania; Tchihatchef foundation (3000 francs), for recompense or assistance to naturalists distinguished in the exploration of the lesser-known parts of Asia, excluding British India, Siberia, Asia Minor, and Syria.

Navigation.—The prize of 6000 francs, for work increasing the efficiency of the French naval forces; Plumey prize (4000 francs), for improvements in steam engines or any other invention contributing to the progress of steam navigation.

Physics.—Kastner-Boursault prize (2000 francs), for the best work on the various applications of electricity in the arts, industry, and commerce; Gaston Planté prize (3000 francs), to the author of a discovery, invention, or work important in the field of electricity; Hébert prize (1000 francs), for the best treatise or most useful discovery for the popularisation and practical use of electricity; Henri de Parville prize (1500 francs), for original work in physics; Hughes prize (2500 francs), for an original discovery in the physical sciences, especially electricity and magnetism and their applications; Pierson-Perrin prize (5000 francs), for a discovery in physics.

Chemistry.—Montyon prize (unhealthy trades) (one